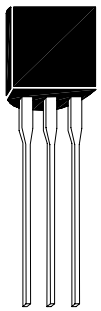
# HLB121A

NPN Triple Diffused Planar Type High Voltage Transistor



TO-92

## Description

The HLB121A is a medium power transistor designed for use in switching applications.

## Features

- High breakdown voltage
- Low collector saturation voltage
- Fast switching speed

## Absolute Maximum Ratings

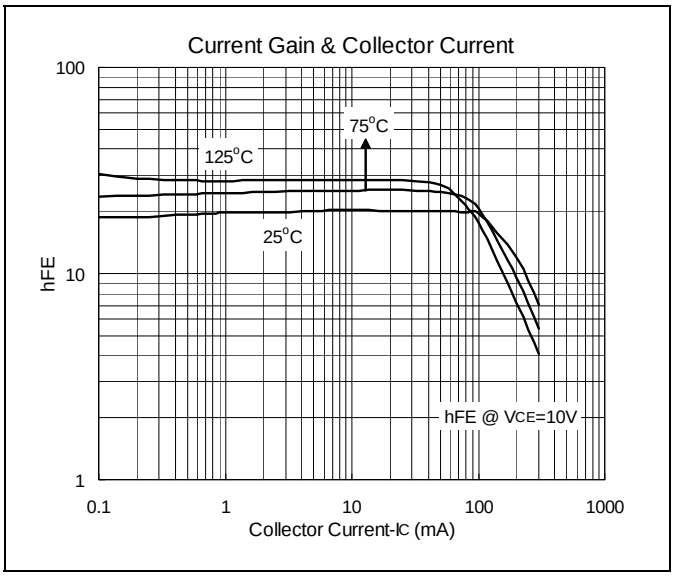
- Maximum Temperatures
  - Storage Temperature ..... -55 ~ +150 °C
  - Junction Temperature ..... +150 °C
- Maximum Power Dissipation
  - Total Power Dissipation ($T_A$=25°C) ..... 1 W
  - Total Power Dissipation ($T_C$=25°C) ..... 10 W
- Maximum Voltages and Currents
  - $BV_{CBO}$ Collector to Base Voltage ..... 600 V
  - $BV_{CEO}$ Collector to Emitter Voltage ..... 400 V
  - $BV_{EBO}$ Emitter to Base Voltage ..... 6 V
  - $I_C$ Collector Current (DC) ..... 300 mA
  - $I_C$ Collector Current (Pulse) ..... 600 mA
  - $I_B$ Base Current (DC) ..... 40 mA
  - $I_B$ Base Current (Pulse) ..... 100 mA

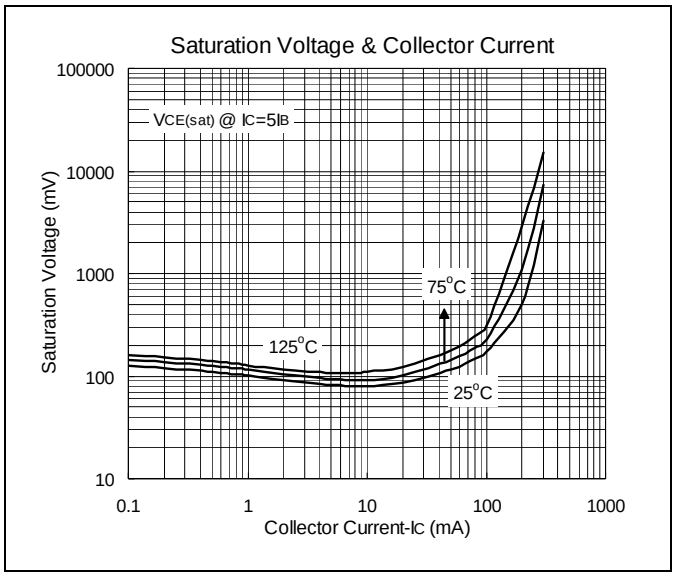
## Electrical Characteristics ($T_A$=25°C)

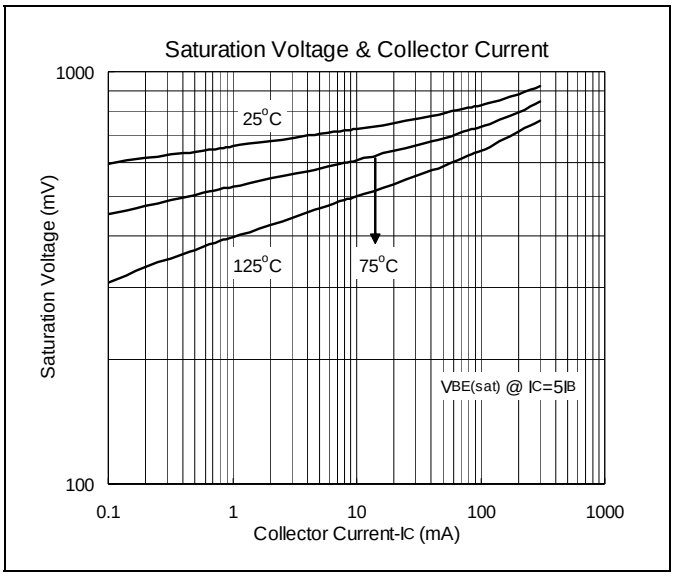
| Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|
| $BV_{CBO}$ | 600 | - | - | V | $I_C$=100uA |
| $BV_{CEO}$ | 400 | - | - | V | $I_C$=10mA |
| $BV_{EBO}$ | 6 | - | - | V | $I_E$=10uA |
| $I_{CBO}$ | - | - | 10 | uA | $V_{CB}$=550V |
| $I_{CEO}$ | - | - | 10 | uA | $V_{CB}$=400V |
| $I_{EBO}$ | - | - | 10 | uA | $V_{EB}$=6V |
| *$V_{CE(sat)1}$ | - | - | 400 | mV | $I_C$=50mA, $I_B$=10mA |
| *$V_{CE(sat)2}$ | - | - | 750 | mV | $I_C$=100mA, $I_B$=20mA |
| *$V_{BE(sat)}$ | - | - | 1 | V | $I_C$=50mA, $I_B$=10mA |
| *$h_{FE1}$ | 8 | - | - | | $V_{CE}$=10V, $I_C$=10mA |
| *$h_{FE2}$ | 10 | - | 36 | | $V_{CE}$=10V, $I_C$=50mA |

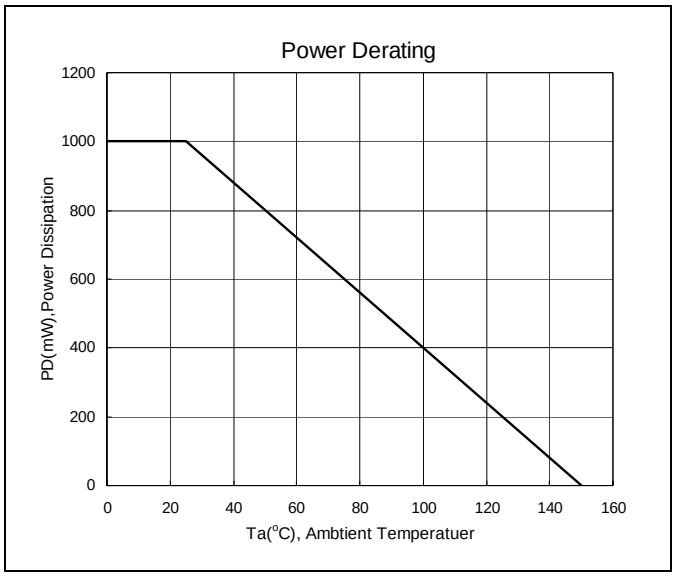
*Pulse Test: Pulse Width ≤380us, Duty Cycle≤2%

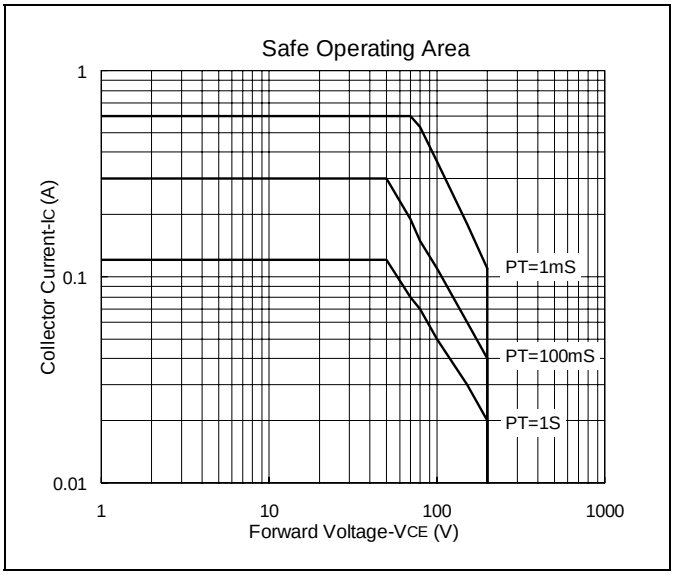
## Characteristics Curve



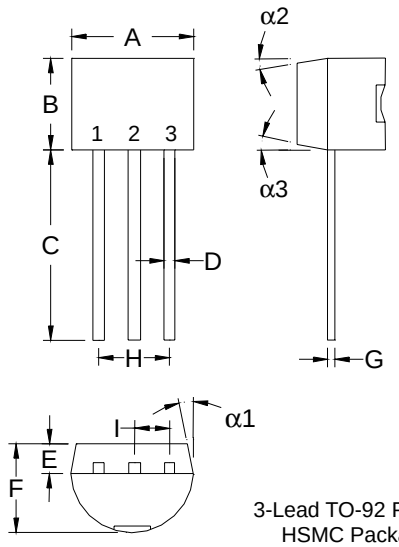



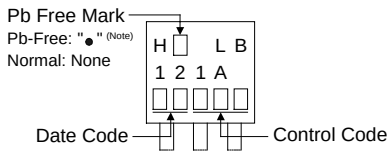



## TO-92 Dimension




3-Lead TO-92 Plastic Package
HSMC Package Code: A

Marking:




Note: Green label is used for pb-free packing

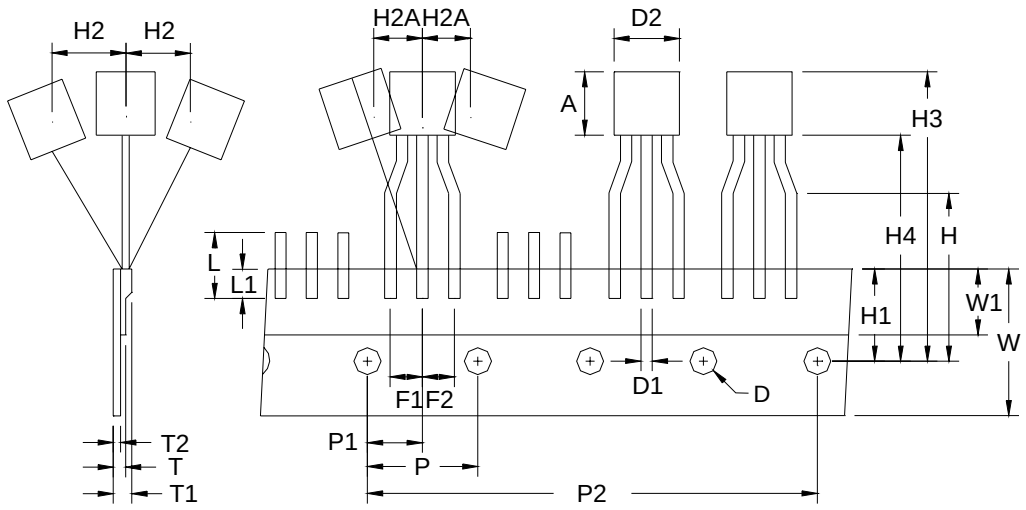
Pin Style: 1.Emitter 2.Collector 3.Base

Material:
- Lead solder plating: Sn60/Pb40 (Normal), Sn/3.0Ag/0.5Cu or Pure-Tin (Pb-free)
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0

| DIM | Min. | Max. |
|---|---|---|
| A | 4.33 | 4.83 |
| B | 4.33 | 4.83 |
| C | 12.70 | - |
| D | 0.36 | 0.56 |
| E | - | *1.27 |
| F | 3.36 | 3.76 |
| G | 0.36 | 0.56 |
| H | - | *2.54 |
| I | - | *1.27 |
| α1 | - | *5° |
| α2 | - | *2° |
| α3 | - | *2° |

*: Typical, Unit: mm

## TO-92 Taping Dimension




| DIM | Min. | Max. |
|---|---|---|
| A | 4.33 | 4.83 |
| D | 3.80 | 4.20 |
| D1 | 0.36 | 0.53 |
| D2 | 4.33 | 4.83 |
| F1,F2 | 2.40 | 2.90 |
| H | 15.50 | 16.50 |
| H1 | 8.50 | 9.50 |
| H2 | - | 1 |
| H2A | - | 1 |
| H3 | - | 27 |
| H4 | - | 21 |
| L | - | 11 |
| L1 | 2.50 | - |
| P | 12.50 | 12.90 |
| P1 | 5.95 | 6.75 |
| P2 | 50.30 | 51.30 |
| T | - | 0.55 |
| T1 | - | 1.42 |
| T2 | 0.36 | 0.68 |
| W | 17.50 | 19.00 |
| W1 | 5.00 | 7.00 |

Unit: mm

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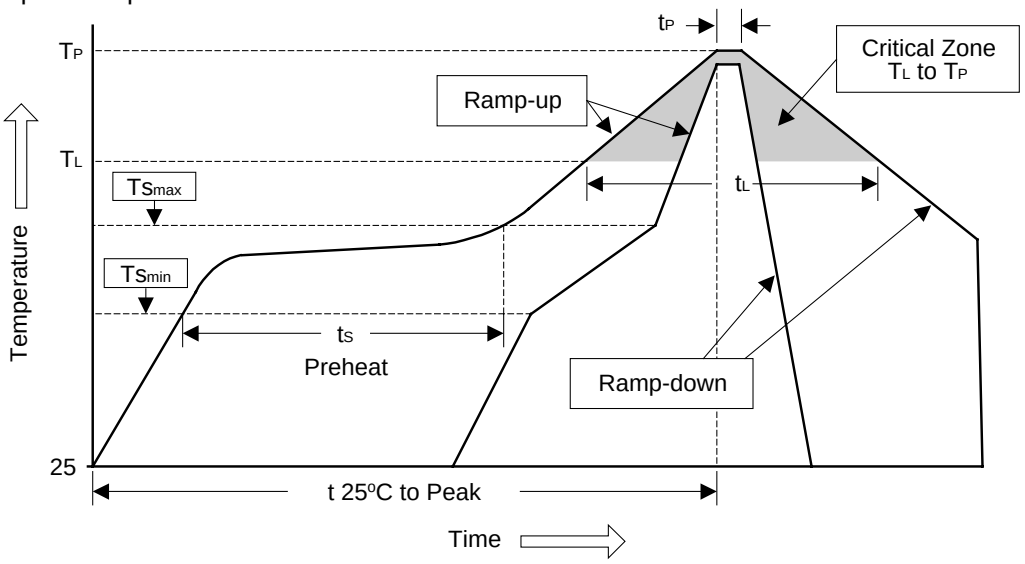
## Soldering Methods for HSMC's Products

1. Storage environment: Temperature=10°C~35°C Humidity=65%±15%

2. Reflow soldering of surface-mount devices

Figure 1: Temperature profile




| Profile Feature | Sn-Pb Eutectic Assembly | Pb-Free Assembly |
|---|---|---|
| Average ramp-up rate ($T_L$ to $T_P$) | <3°C/sec | <3°C/sec |
| Preheat<br>- Temperature Min ($Ts_{min}$)<br>- Temperature Max ($Ts_{max}$)<br>- Time (min to max) (ts) | <br>100°C<br>150°C<br>60~120 sec | <br>150°C<br>200°C<br>60~180 sec |
| Tsmax to $T_L$<br>- Ramp-up Rate | <br><3°C/sec | <br><3°C/sec |
| Time maintained above:<br>- Temperature ($T_L$)<br>- Time ($t_L$) | <br>183°C<br>60~150 sec | <br>217°C<br>60~150 sec |
| Peak Temperature ($T_P$) | 240°C +0/-5°C | 260°C +0/-5°C |
| Time within 5°C of actual Peak Temperature ($t_P$) | 10~30 sec | 20~40 sec |
| Ramp-down Rate | <6°C/sec | <6°C/sec |
| Time 25°C to Peak Temperature | <6 minutes | <8 minutes |

3. Flow (wave) soldering (solder dipping)

| Products | Peak temperature | Dipping time |
|---|---|---|
| Pb devices. | 245°C ±5°C | 5sec ±1sec |
| Pb-Free devices. | 260°C +0/-5°C | 5sec ±1sec |